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QUALITY MILK PAYS

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Prepared by
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FOREWORD

The fact that milk is nature's most nearly perfect food has long been known and accepted throughout the world. Quality milk is highly nutritious but it is not for this reason alone that it is consumed by children and adults: fresh, clean, cold milk is a pleasant tasting, satisfying beverage enjoyed by all who drink it.

The demand for quality in milk and milk products is ever increasing. This fact, coupled with keen competition for the consumer's dollar by substitutes for dairy foods makes it imperative that we strive to produce quality products.

The introduction of milk grade standards in Alberta has been aimed at improving the quality of our milk supply and it is hoped that this bulletin will be of assistance towards that end.

The following factors affecting quality milk production will be discussed in this publication. These are the keys to successful milk production.

1. CLEAN, HEALTHY HERDS
2. CLEAN BARNS AND YARDS
3. GOOD MILKING PRACTICES
4. CLEAN, STERILE UTENSILS
5. FAST COOLING—COLD STORAGE

ACKNOWLEDGMENT

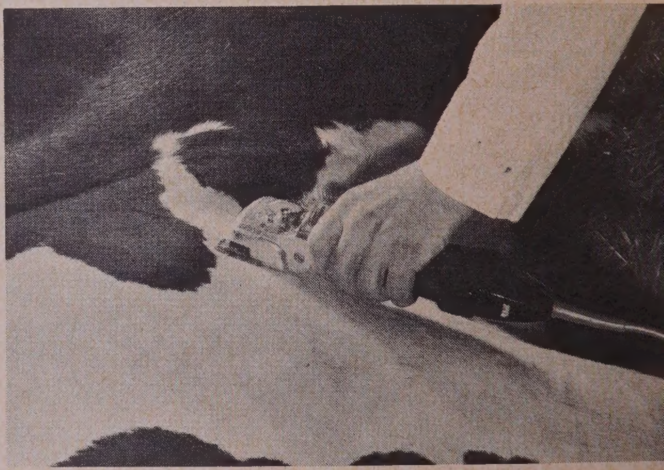
The Dairy Branch acknowledges with thanks the kind assistance given by Dr. L. F. L. Clegg, Head, Department of Dairy Science, University of Alberta, for reviewing the manuscript and offering many helpful suggestions in the preparation of this bulletin.

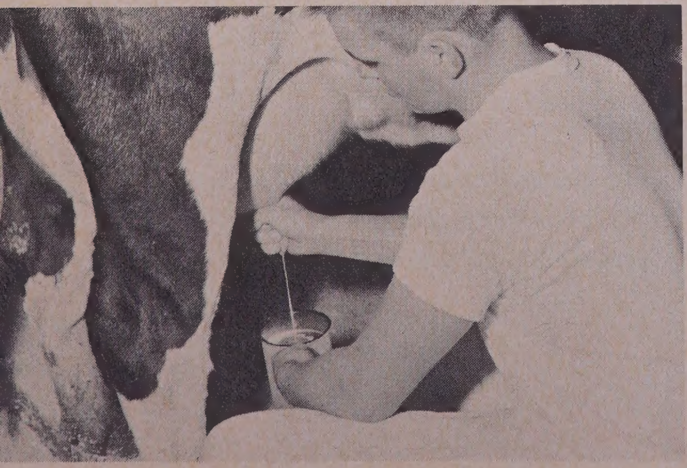
CLEAN, HEALTHY HERDS

Unless the herd is clean and healthy it is impossible to produce quality milk. The following recommendations should be followed to ensure cleanliness, quality and high production:

1. Clip Flanks and Udders

Keep flanks and udders clipped to facilitate washing before milking. This will reduce the possibility of mud and manure getting into the milk.





2. Use a Strip Cup

The strip cup is useful in detecting mastitis. Hand milk a few streams of fore milk into the cup and watch for signs of abnormal milk. This disease may be easily controlled in the early stages, but if allowed to go unchecked, will cause a loss in production and may mean the loss of the animal. Always milk infected cows last to check the spread of the disease. (See Section on Mastitis.)

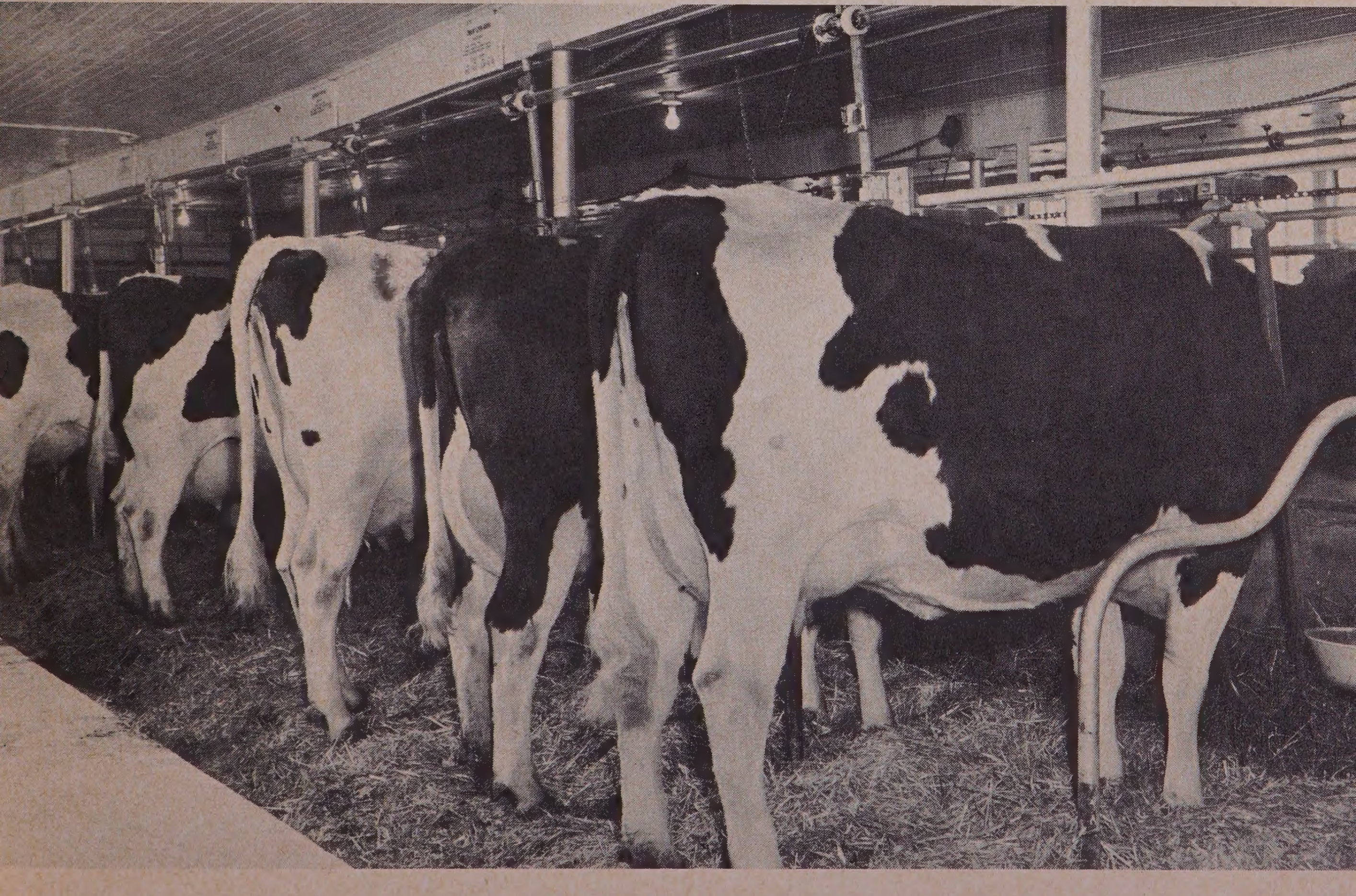
CLEAN BARNS AND SURROUNDINGS

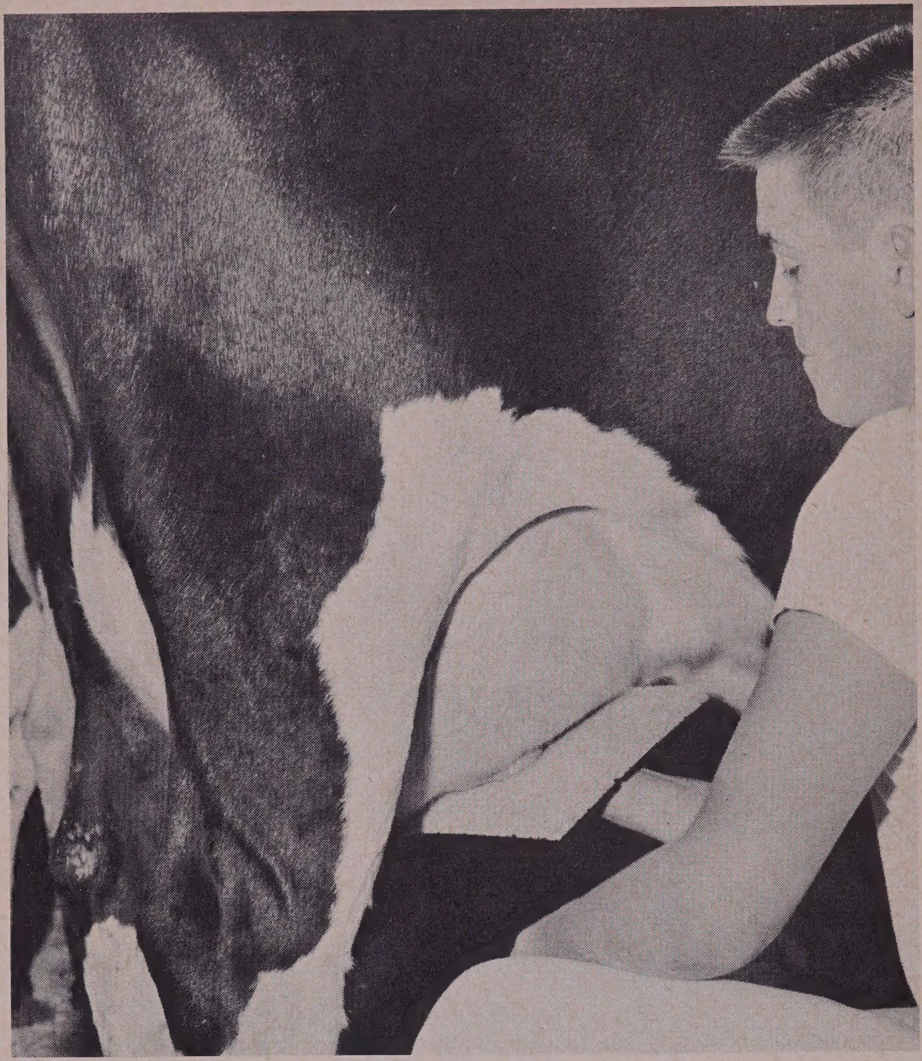
Barns should be built on elevated land to permit drainage and to reduce the possibility of wet, muddy yards.

The area around the barn should be gravelled or paved, especially around traffic areas. The purpose of this is twofold: to reduce the labor involved in washing flanks and udders prior to milking and to reduce the possibility of dirt entering the milk.

The construction and care of the barn interior is also very important. Certain principles should be observed in both loafing and stanchion barns.

1. Barn should have sufficient ventilation.
2. All openings should be fitted with screens.
3. Set up a definite program for the control of flies, mice, etc.
4. Allow plenty of clean bedding for each animal.
5. Sprinkle lime in alleys and gutters of stanchion barns to reduce odours.
6. Manure should be removed regularly and spread on fields, rather than piled outside where it will become a breeding place for flies.





FOLLOW GOOD MILKING PRACTICES

Udders (and when necessary flanks) should be washed immediately before every milking:

1. To remove soil from the udder, thus helping to assure clean, sweet flavoured milk and cream.
2. Gentle massage while washing with warm water stimulates milk let down. This helps to speed up the milking operation. Separate cloths or paper towels are recommended for each animal in order that the possibility of spreading infection from one animal to another is reduced. Always use a sanitizer in the water.

Milk Handlers Should Be Clean

1. Wear clean clothing, preferably white.
2. Thoroughly wash hands and arms before milking.
3. Wear head covering, especially if milk is handled in open pails or containers.
4. The milking operation should be completed as quickly as possible. Unnecessary delays will affect the "let down" process.

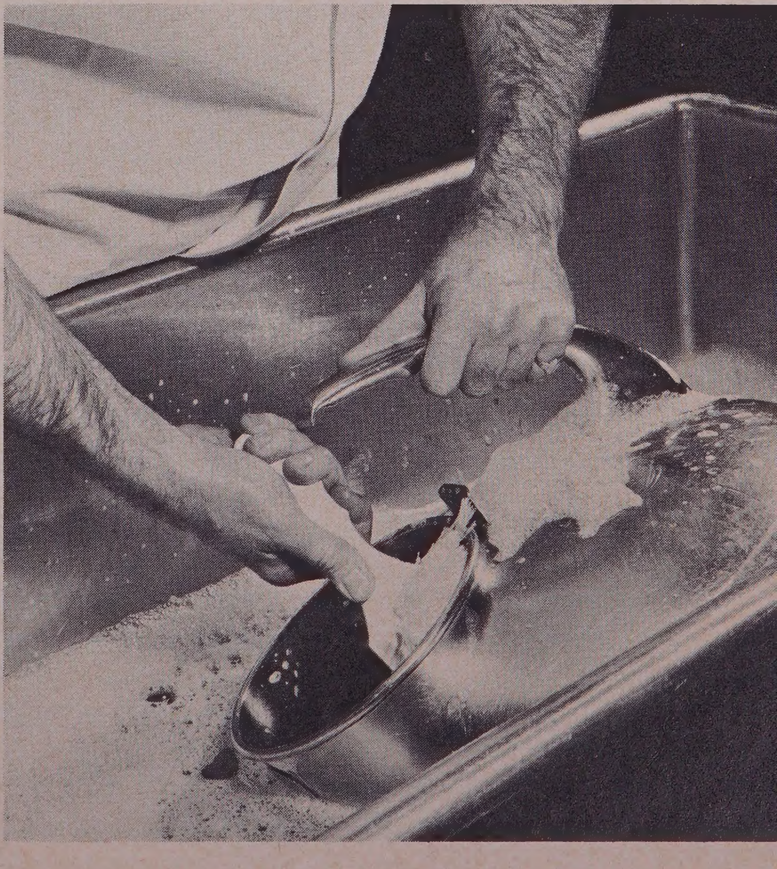
REMEMBER: You are handling a food product. Do unto others as you would have them do unto you.

WASHING EQUIPMENT

The same washing and sanitizing procedure may be followed with all utensils with the exception of the rubber parts of the milking machine.

1. Rinse utensils with cold or lukewarm water immediately following use. This removes the film of milk that remains, making the rest of the washing operation easier.

2. Scrub with hot water and detergent following the manufacturers' directions and using the brushes provided. Use a detergent type cleanser rather than soap as soap leaves a greasy film which is difficult to rinse off. Do not use wash cloths on your equipment.



3. After brushing, rinse by drawing clean water through each unit. Hot water will hasten drying.

4. Place milking heads, pails, strainers, etc., on drying racks to drain.

5. Immediately before the next milking assemble the milking machine and then sanitize all equipment using a sanitizing solution of recommended strength.

CARE OF RUBBER PARTS

Treat clusters in a lye rack or soak rubber parts in a lye solution made by adding two level teaspoons of flake lye to a gallon of cold water in an earthenware crock. This gives a solution of 0.5%. Once a week, liners should be boiled in a lye solution made up by adding eight teaspoons of lye per gallon of cold water and brought to the boil in a stainless or mild steel container. NEVER ADD LYE TO HOT WATER. The lye solution removes fat adhering to the rubber and also sanitizes the rubber and prolongs its life. (Write for Publication No. 97.)

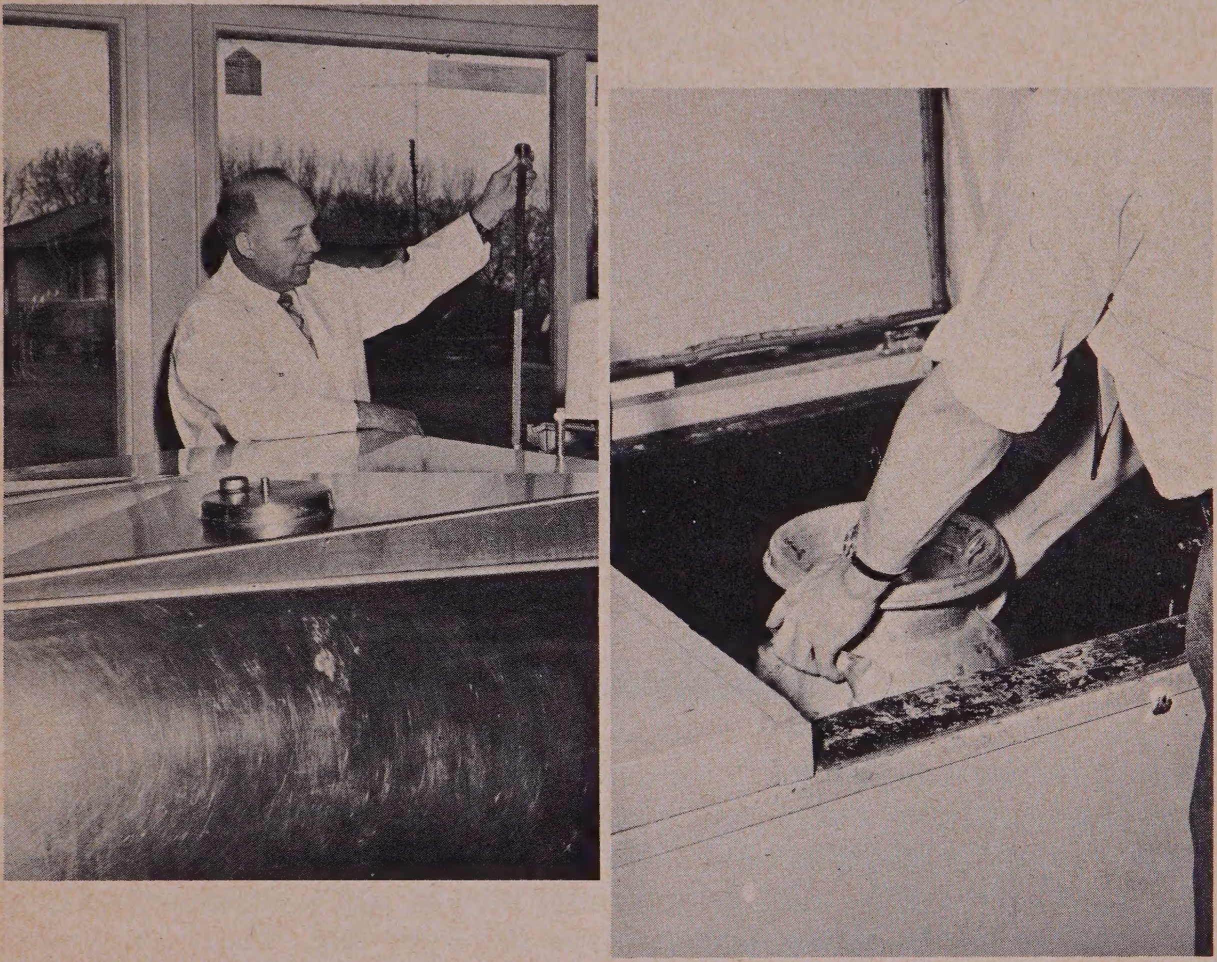
An alternate lye treatment is the immersion system which is outlined in the joint series publication No. 159, obtainable from the Department of Dairy Science, University of Alberta or the Dairy Branch, Alberta Department of Agriculture.

CAUTION

Lye is highly corrosive and will cause serious burns to skin and clothing. Keep lye out of reach of children and farm animals. Do not permit lye to come in contact with any metals other than stainless or mild steel.

COOLING AND STORAGE OF MILK

Milk must be cooled rapidly and kept cool to retain its high quality. However, we must not lose sight of the fact that production of clean milk is essential. Refrigeration can only help to maintain quality, it cannot improve milk of low quality caused by dirt and unsanitary practices.



Pictured at the left is a bulk milk tank—on the right is one type of cooler for milk cans. Both systems provide for rapid cooling and cold storage.

Follow these hints for can cooling:

1. Milk should be cooled rapidly and stored below 50° F.

2. Do not permit excessive agitation of milk during cooling, this is one of the commonest causes of bitter flavour in milk.

3. Do not add warm milk to previously cooled milk in cans. The cooling process is slow, and undesirable flavours are liable to develop. Due to efficient refrigeration, bulk milk tanks are capable of cooling warm milk very rapidly thus reducing the possibility of bitterness developing.

4. Keep milk covered to prevent entry of dirt, flies and undesirable odours.

QUALITY TESTS FOR MILK

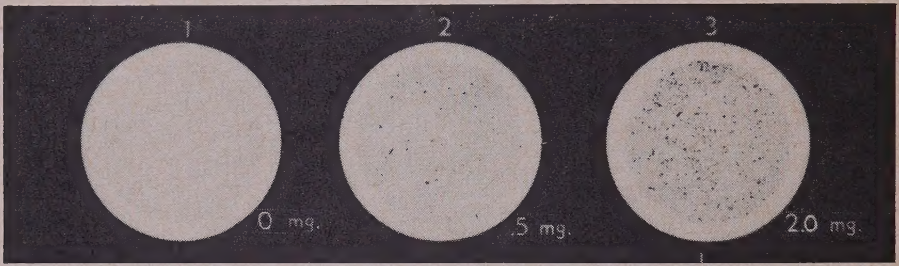
1. Taste and Smell

This test is carried out daily on all milk received at the processing plant and is used to grade milk on a basis of flavour and odour. The standard procedure is for the milk grader to smell the milk immediately the lid is loosened on the can. In cases of doubt, the grader will taste the milk. Where bulk milk tanks are involved, it is the responsibility of the Tank Milk Grader (tanker driver) to grade the milk before it leaves the farm bulk tank.

2. Temperature Checks

Temperature checks are carried out periodically at the processing plants as the milk is received. The temperature of the milk in bulk tanks must be recorded at each pick-up on a form provided. It is essential for milk to be properly cooled if the fine flavour is to be preserved.

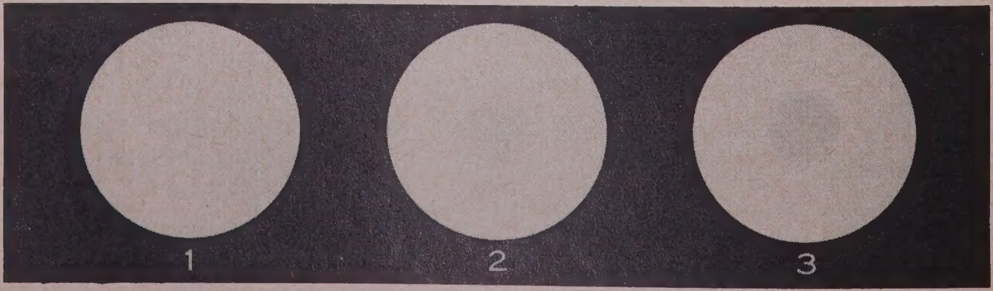
3. The Sediment Test



The test commonly in use now on milk shipped in cans is known as the "off-the-bottom" sediment test. A stainless steel tube fitted with a rubber plunger and lintine sediment disc is inserted into the can of milk. As the plunger is withdrawn, the head of the tester containing the disc is drawn diagonally once across the bottom of the can. The milk in the tube (16 oz.) is discharged and any sediment or foreign matter is trapped on the filter disc. These are graded according to standards which have been set up. (Illustrated above.)

Sediment test for bulk milk

A 16-oz. sample of milk is lifted from the bulk tank after it has been agitated for five minutes. The milk is passed through a filter disc which has a filtering diameter of 4/10 of an inch, whereas the "off-the-bottom" sediment tester uses a filter disc with a filtering diameter of 1 inch. The discs are compared with prepared standards and graded accordingly.



4. Reduction Tests

The tests designated for use in Alberta are the Methylene Blue and Resazurin (Reductase tests). These tests are used to determine the bacterial quality of raw milk. A dye is added to a specific volume of milk and incubated at near body temperature. In both tests a colour change indicates the reduction time of the milk depending on bacteria present and assesses the quality of the milk under test.

5. Acidity Test

The purpose of this test is to show the amount of acid development in milk or cream. The acidity is expressed in percent lactic acid and is assumed to be produced by lactic acid producing bacteria. Fresh milk from healthy cows contains very little acid but failure to follow recommended procedures regarding sanitation and proper cooling will rapidly cause milk to sour.

MASTITIS

Mastitis is an udder disease which causes heavy financial losses to the dairy farmers of Alberta every year. As a result of this disease the cow's milk production is reduced, the fat test is lowered and the productive life of the cow is shortened.

Chronic Mastitis

The bacteria causing this disease attack the milk secreting cells which often turn into non-productive scar tissue. The early symptoms are flaky or clotted milk while the milk from a badly infected cow may show indications of blood or pus.

Acute Mastitis

This type is often caused by a cut or injured teat. The udder may show swelling and the animal may show signs of sickness. If the animal is not treated promptly death may result.

Spread of the Disease

Mastitis is rapidly transmitted from one cow to another. Calves fed mastitis milk or allowed to suck a cow known to be infected, may spread the disease by sucking each other. Injuries to the udder make it more susceptible to infection.

Preventative Measures

1. Do not allow cows to come in contact with machinery or junk lying around the yard.

2. Supply sufficient clean, dry bedding to protect the cow from cold and dampness, especially during the winter.

3. Allow ample stall space for each cow making sure that the udder does not hang over the gutter when the cow is lying down. If the animals are crowded the udders may be stepped on causing injury. Keep stalls and gutters clean.

4. Follow the manufacturer's recommendations regarding operation of the milking machine. Do not operate the machine with a higher vacuum than recommended. REMOVE THE TEAT CUPS AS SOON AS THE COW IS MILKED OUT.

Follow Sanitary Practises

As previously stated, udders and flanks should be clipped. They should also be washed with a paper towel or cloth dipped in warm water to which has been added a suitable sanitizing agent. Separate towels or cloths should be used for each cow to control the spread of the disease. Always milk known infected cows last.

Control and Treatment

The first step in a sound program is to consult a veterinarian. Samples of milk should be taken from each quarter and submitted to a laboratory for analyses. This will indicate the extent to which the disease has progressed and the type or types of bacteria causing the infection. This information is supplied to the veterinarian who will prescribe the proper treatment and carry it out. The herd owner who attempts treatment on his own without a laboratory analyses and veterinary diagnosis may well be wasting money by using improper treatment, and aggravating the infection.

For complete details of the mastitis program contact:

Veterinary Services Branch
Alberta Department of Agriculture
Edmonton, Alberta

No one can deny that antibiotics have been a real boon in combatting herd diseases. However, the producer who uses antibiotics has a responsibility to consumers. The "wonder drugs" are a definite hazard to a small percentage of the population. In addition, manufacturers of products such as cheese, cottage cheese and other cultured products suffer considerable financial loss through the presence of even minute quantities of antibiotics in milk. There are strict regulations governing the sale of milk from treated cows and it is the responsibility of the producer to withhold shipments until the milk is entirely free of antibiotics. (Follow the Instructions on the label.)

PESTICIDE RESIDUES IN MILK

The dairy industry as well as the Food and Drug Division of the Department of Health and Welfare are becoming increasingly concerned over the fact that traces of these chemicals are appearing in some food products. While pesticides, herbicides, etc., are very necessary in modern agriculture, it is also essential that these products are not misused. Use only brands recommended by specialists and follow exactly the **directions** for use on the container. For details on the use of these products contact your local D.A. or Pest Control officer, Alberta Department of Agriculture.

OFF FLAVOURS IN MILK

Feed and Weed

One of the commonest flavour defects in milk is caused by feeds and weeds. These flavours are rapidly transmitted to the blood stream and hence to the udder. Milk from cows turned out to fresh clover, crested wheat grass and alfalfa will have a strong flavour and odour particularly in the spring. This can be partially if not completely eliminated if the animals are moved from strong feeds two or three hours before milking. Feeding on lush spring pastures should be limited until the herd has adjusted from barn to pasture feeding.

Absorbed and Adsorbed

Milk readily absorbs strong odours such as manure, gasoline, fly spray and musty cellars. It is therefore important that anything causing strong odours should be removed from the vicinity of the cow and milk. Strong odours breathed in by the cow will also be rapidly transmitted by the lungs via the blood stream to the udder. Always use a separate storage for milk, and provide mechanical refrigeration where possible. Milk will pick up odours quickly if stored near any foodstuffs such as are found in the household refrigerator.

Bitter

Bitter flavour in milk may be caused by a variety of factors. This flavour is most common during the winter months although it will appear at any time of the year. The usual cause of bitterness during the winter is the feeding of poor quality hay. The obvious remedy is to feed good quality hay. Another cause of this flavour is due to the mixing of warm and cold milk. It should be pointed out here that bulk milk tanks are constructed in such a way that the warm milk entering the tank is rapidly cooled before the enzyme responsible for bitterness has a chance to become active.

Still another cause of bitter flavour may be traced to the stage of lactation of the cow. As lactation progresses there is a change in the chemical composition of the milk caused by increased concentration of the various salts. If the flavour becomes too pronounced, it is advisable to withhold this milk from regular shipments and use it as an animal feed.

The fourth possible source of bitter flavour in milk is from unhealthy cows. The Provincial Board of Health Regulations and the Dairymen's Act specify that milk shall not be sold from an animal "known to be infected with a disease affecting the quality of the milk or otherwise endangering human health." In addition the Regulations under the Dairymen's Act state: "No person shall offer for sale any milk from a cow, produced in the period of fifteen days before or three days after parturition."

Milk producers enjoy a preferred market and it is their duty and responsibility not only to maintain this market but to cause this market to be expanded by producing only high quality milk. The appearance of dairy substitutes on the scene should give us an added incentive to strive at all times to deliver only milk of the highest quality to the processing plants.

Metallic

As the name implies, this flavour is caused by metal contamination. The usual sources are worn or rusty metal equipment such as pails, separator discs and shipping cans. Now that stainless steel is being used so widely in the dairy industry this defect should be all but eliminated. In some cases it is possible to use one of the new plastics. Care should be used in buying these plastic materials in order that a suitable product is obtained. They must be able to withstand heat sufficient to sanitize without peeling or cracking.

SHIPPING CONTAINERS

Cans used to ship milk to market must be maintained in a satisfactory condition. Old cans with broken or rusty seams are almost impossible to keep in a sanitary condition. This will cause a rapid decline in milk quality. Another point to bear in mind is that although the processing plants wash the cans before they are returned it is the responsibility of the producer to sanitize the can immediately before it is used.

Nearly all bulk milk tanks are constructed of stainless steel and are quite easily washed and sanitized. However, here, too, a certain amount of care is needed in the washing procedure. It is the duty of the tanker driver to rinse the tank after it is pumped out, but the producer is responsible for proper washing and sanitizing.

It is the hope of the Dairy Branch that this bulletin will be of use to you in producing milk of the highest quality in order that the demands of today's market may be met.

LIST OF PUBLICATIONS AVAILABLE FROM THE DEPARTMENT OF AGRICULTURE, EDMONTON, UPON REQUEST

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EDMONTON, ALBERTA
Printed by L. S. WALL, Printer to the Queen's Most Excellent Majesty,
1964